

ABSTRACT

Systems and methods for radiographic imaging of tissue using a radio-opaque imaging agent that in one embodiment accumulates intracellularly in tissue in proportion to its functional, or physiological, activity. In one embodiment, the imaging agent is a cell membrane-permeable, radio-opaque, high affinity ligand for an intracellular target. The imaging agent is administered to a patient, and after an accumulation interval, radiographic images are acquired. The imaging agent preferentially accumulates in certain types of tissue and increases its radio-opacity. The tissue being examined is transilluminated by X-ray beams with preselected different mean energy spectra, and a separate radiographic image is acquired during transillumination by each beam. An image processing system may perform a weighted combination of the acquired images to produce a single displayed image. The system and method thus provides a functional image displayed with the anatomical detail and spatial resolution of a radiographic image. Functional and anatomical information are displayed in complete registration, facilitating localization of abnormal tissue in relation to nearby anatomical structures.